

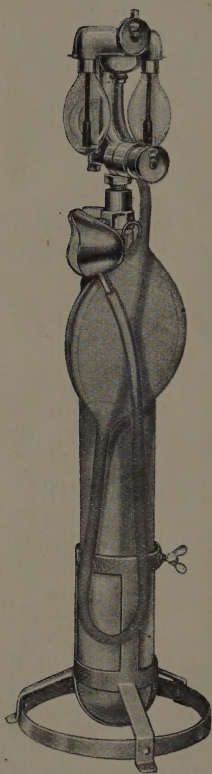
AIR RAID PRECAUTIONS

The Treatment of Gas Casualties by Direct
Application of Re-agents

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RESPIRATORY

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THE COLLISON INHALER
MOUNTED UPON AN OXYGEN
CYLINDER

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MEDICAL OPINION

IT is the considered opinion of leading lung specialists in this country that Collison Inhalers should be made available under the provisions of the Air Raid Precautions Act for the immediate first aid and subsequent treatment of poisonous gas casualties among the civil population.

This memorandum has been drawn up to indicate the procedure of combating the effects of poison gas by the direct application of reagents to the respiratory system as detailed in the accompanying pages under the following headings :—

1. General Information.
2. Treatment of Irritant Gases.
3. Treatment of Blister Gases.
4. Treatment of Paralysant Gases.



GENERAL INFORMATION

Collison Inhalers are provided at The Brompton Hospital, Guy's Hospital, King's College Hospital, The Royal Free Hospital, City of London Hospital for Diseases of the Chest, St. Bartholomew's Hospital and others in London and the Greater London area, and also in the provinces.

By means of the Collison Inhaler therapeutic agents such as adrenalin, creosote, etc., are transformed from liquids into vapour, the subdivision of which is so infinitesimal as to be on the border line between gas and a gaseous vapour of minute particles suspended in oxygen. The process of such fine atomization is carried out by the pressure in oxygen cylinders to which the inhaler is attached.

The atomized liquids are inhaled with the oxygen, which are thus brought into direct contact with the lung surfaces, to which they adhere and by which they are absorbed.

The function of the lungs is to absorb air, and normally they absorb the oxygen in the atmosphere.

Gaseous vapour (as opposed to a coarse vapour or spray) is likewise absorbed and even minute particles of dust, which are responsible for much industrial illness, such as silicosis, tuberculosis and asthma.

In relation to A.R.P. the rapidity of absorption is vividly illustrated in the devastating effect of poison gases, even in weak concentrations, and so immediate is its action that only casualties that receive treatment within a few minutes on the lines indicated can escape unharmed.

It cannot be too strongly emphasized that the

whole of the bronchial tree is equally susceptible to therapeutic and neutralizing agents as it is to those that are harmful and corroding. The following indications are intended to set out that therapeutic and antiseptic vapour is the counterpart to those which are poisonous and harmful.

The adequate provision of proper protection of the lung surfaces herein described would minimize one of the greatest perils to the civil population in time of war.

IRRITANT GASES

Chlorine,
Phosgene,
Di-phosgene,
Chloropicrin.

"All lung irritant gases cause essentially the same type of pathological effect, this being most pronounced on the alveoli of the lungs and on the smaller bronchial tubes, and the great danger to be feared is the onset of acute pulmonary oedema."

(Extract from A.R.P. Handbook No. 3.)

It is in the light of such knowledge upon the conditions to be met with that the direct and immediate application of re-agents becomes primarily a most urgent first aid treatment. The vapour produced by Collison Inhalers is so fine that it reaches the whole of the bronchial tree, including the finer bronchi and the alveoli, and is moreover adequate in density and volume to be fully effective.

In the case of irritant gases, hydrochloric acid is introduced into the lungs which "eats" into

the tissue. It is vitally important that the acid should be rendered inert at the earliest possible moment and with this in view a neutralizing agent should be immediately applied to the whole of the bronchial tree including the alveoli and finer bronchi where the poison gas has penetrated. To bring about neutralization, Bicarbogene—a preparation with a sodium bicarbonate base—should be applied (by inhalation) at the earliest possible moment so as to abort or retard the onset of the great danger of pulmonary oedema.

For this reason, respiratory casualties of this type should be given priority in treatment over other gas casualties—non-respiratory. Treatment can be quickly given by placing a mask over the face and turning on the oxygen and vapour, which is a matter of a few seconds.

It is vitally important, when irritant gas is known to be present, that all casualties complaining of a slight cough and tightness of chest should be similarly treated at once. These symptoms may indicate “insidious onset,” and which later may become rapidly worse and prove fatal due to the onset of pulmonary oedema.

In cases where pulmonary oedema is suspected or known, Apneugene (an adrenalin preparation for atomization with oxygen) should be included in treatment with the view of retarding and minimizing its development. In cases of this kind, at first aid stations, the treatment would be the inhalation of a gaseous vapour consisting of oxygen, Bicarbogene and Apneugene. (The inhalation of Apneugene has been employed in the past for the purpose of arresting pulmonary oedema due to certain heart conditions.)

The protection to the personnel of first aid stations of a short inhalation of Bicarbogene to

neutralize the action of irritant gases cannot be too strongly emphasized.

In cases where some delay has occurred in putting on gas masks, or when some gas has been inspired while carrying out various duties, a short inhalation, without taking off the mask, may avoid serious results. This can be done by directing the vapour to the intake valve of the mask.

SUBSEQUENT TREATMENT

Subsequent treatment by inhalation in hospital will vary in relation to conditions. The continued employment of Apneugene (with oxygen) will be indicated for pulmonary oedema and the vital importance of the direct application of other therapeutic agents to the alveoli and finer bronchi is particularly emphasized.

BLISTER GAS

MUSTARD GAS

The effects of blister gas upon the lungs is apparent far sooner than on other parts of the body, which is due to the great sensitivity of the surfaces.

Congestion and inflammation quickly develops and causes extreme dispnoea, or shortness of breath, accompanied by gasping.

The administration of oxygen is essential, but will not affect these conditions, for which Apneugene should be inhaled. This preparation, which consists of adrenalin and anaesthesin, will reduce both congestion and inflammation, and greatly assist breathing, thus minimizing to some

appreciable extent the effects of poison deposited in the lung tissue, until it becomes inert. The inhalation of a soothing oil, such as Cajuput, is recommended to be used in conjunction with Apneugene, to reduce coughing and render expectoration less difficult.

Provided treatment can be administered immediately the casualty has inspired blister gas, oxygen and Bicarbogene is indicated, with a view of neutralizing its effects. The vapour should be breathed at times through the nose, and at times through the mouth, in order to reach the upper air passages as well as the mouth and throat. Subsequent treatment should be directed towards warding off broncho-pneumonia, as the majority of deaths from mustard gas are due to secondary infection.

SUBSEQUENT TREATMENT

The direct application of Apneugene should be continued for the purpose of reducing congestion and inflammation and assisting the breathing, but Cajuput oil should be substituted either by Campheugene, which stimulates the breathing centre, helps the heart, and acts as a powerful antiseptic against bacterial invasion, while the soothing effect of the menthol will help expectoration, as will the oil base of this preparation.

If stimulation of the breathing is contra-indicated, creosote is recommended, which will also afford protection against infection and greatly assist expectoration.

Treatment by the direct application of these preparations to the lung surfaces during the last fifteen years has clearly indicated the importance of starting it at the outset of these conditions, and that patients who are liable to contract

bronchitis can ward it off completely upon the first sign of laryngeal irritation or discomfort.

Bacterial invasion is arrested, and frequently recovery is rapid.

LEWISITE

The great irritancy of Lewisite results in the immediate adoption of protective measures, and gas masks (if available) are at once used, owing to the intolerable character of the vapour.

In cases where protection has been absent, or only partial, every effort should be made to abort the development of bronchitis, which usually ensues and is otherwise well established in twenty-four hours.

Immediate treatment consisting of oxygen with Apneugene and Campheugene as already set out.

PARALYSANT GASES

The danger from these gases is its paralysing effect upon the respiratory centre in the brain, and oxygen should be at once administered, the greatest care and attention being taken that the mask is properly held to the face, and that the casualty is breathing from the storage bag which should deflate at each inspiration. Campheugene—which contains camphor—should be the inhalant employed, to stimulate the breathing centre, which in this type of casualty is vitally important. Oxygen and camphor has a similar action to oxygen and CO^2 , which is unlikely to be available at all first aid posts.

Apart from the above action of the application of camphor in this preparation on the breathing

centre, which is all important, the ventilation of the lungs will be secured, and the poisonous gas evacuated. The heart will also be helped.

The action of Guaiacol will afford protection against infection, and menthol relieve the irritation. The oil base will greatly assist expectoration and reduce coughing.

CARBON MONOXIDE

Gas masks do not afford any protection against monoxide poisoning. Lack of oxygen causes unconsciousness. Cyanosis does not appear (the lips, then the face, turning blue). There is no smell. Sudden giddiness is frequently the first warning, and unconsciousness may take place within a very short period.

The mask supplied with Collison Inhalers provides against re-breathing expired air, which will contain carbon monoxide at the beginning of treatment, and which must be entirely evacuated.

Oxygen and Camphene must be administered at the earliest possible moment, or oxygen and CO².

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